

Industry profiles and skills needs

It is evident that the UK government sees that the country's economic future lies in high value, innovative and knowledge-intensive activities, and that to pursue this course a highly skilled science, technology, engineering and mathematics workforce is essential.

Therefore it is imperative that employers and sector bodies work towards ensuring a pipeline of young talent comes into the industry through a co-ordinated approach to STEM subjects at schools, colleges and universities.

Furthermore, regardless of what industry sector you belong to, the UK remains a great place to do business and invest for all:

- the UK is the fifth largest economy in the world and was the fastest growing economy in the G7 in 2015
- it is the highest ranked major economy in terms of ease of doing business, ranked higher than the USA
- the World Economic Forum Competitiveness Report assesses the UK to be in the top ten for global competitiveness
- we are home to 18 of the world's top 100 universities, and four of the top ten
- the UK's corporation tax rate of 20% is the lowest in the G7 and joint lowest in the G20 and will fall to 17% by 2020
- the UK has the best superfast broadband coverage of any major European economy
- the UK has a large, integrated transport system; this includes the second largest ports industry in Europe; the largest air transport system in Europe and the most improved rail network
- the UK is the largest exporter of financial and related professional services in the world

The table below provides a brief overview by size (turnover, employees etc.), skills needs and the future challenges of the 11 key industrial sectors as defined by the Government's industrial strategy as well as Advanced Manufacturing, which, although a combination of sectors is often reported as a self-standing sector in its own right.

Sector	Overview	Skills	Future Challenges
<p>1. Automotive</p>	<p>Fourth largest vehicle producer in Europe, making 1.6 million vehicles in 2012.</p> <p>Annual revenues of over £54 billion, 2% of total UK gross value added (GVA) and exports 80% of production.</p> <p>Annual research and development (R&D) spend of £1.5 billion (14% of total UK manufacturing R&D spend).</p> <p>The Sector employs around 134,000 people with the West Midlands accounting for over a third of this total. The North West, North East and South East are also key drivers of automotive employment, reflecting the location of major automotive manufacturers and their supply chains.</p>	<p>In the short term 2,500 people are needed to fill immediate vacancies, and by 2020 as many as 50,000 more will be needed.</p> <p><u>Skills shortages:</u> programmable logic control; robotics; advanced problem solving; programme management; leadership; computer aided engineering; quality core tools training; manufacturing process knowledge; and welding.</p>	<p>There are expected to be four main areas for technology development in the near future: more efficient internal combustion engines (ICE), energy storage, lightweight structures and powertrains and power electronics. This technology change offers the UK an opportunity to create tomorrow's vehicles, increase market share and create new supply chain companies.</p>
<p>2. Aerospace</p>	<p>First in Europe and second to the US worldwide in aerospace revenues with a 17% global market share.</p> <p>Supports around 280,000 UK jobs, (128,000 people directly, 26,000 in research, design and engineering and over 154,000 jobs indirectly).</p>	<p>There is a shortage of skilled manufacturing engineering and advanced technology skills. It has been highlighted that poor provision for these skills in education and a negative perception of careers in manufacturing may be contributing factors.</p>	<p>The adoption of new technologies such as composites and additive manufacturing is starting to extend through the aerospace supply chain and plastic electronics has significant potential in the future.</p>

	<p>Annual revenues of over £31 billion, 1% of total UK GVA and exports 90% of production - exports around £27 billion a year.</p> <p>Annual R&D spend of £1.4 billion (13% of total UK manufacturing R&D spend).</p> <p>Total civil aerospace market in excess of \$6.2 trillion by 2035.</p>		
<p>3. Agricultural technologies</p>	<p>Agri-tech underpins our food and drink manufacturing sector, which is the UK's largest manufacturing sector, worth £25 billion. The entire agri-food supply chain – from farm to table – is worth £96 billion or 7% of GVA to the UK and employs 3.8 million people.</p> <p>The land-based and environmental sector employs approximately 1.3 million people in 230,000 businesses in the UK where:</p> <ul style="list-style-type: none"> - over four out of five businesses in the sector employ fewer than five staff - 54% of staff are 45 years old or over - the sector is forecast to need 595,000 new entrants between now and 2020. 	<p>A higher percentage of people working in agriculture, forestry and fishing have no formal qualifications compared with those in other sectors of the economy. Furthermore, there is a prevalence of lower level (Level 1 and 2) over technical and higher level (Level 3 and Level 4 or higher) qualifications in the agriculture, forestry and fishing sector. However, the proportion of Level 4+ qualifications has increased by eight percentage points and intermediate qualifications are increasing faster than national averages.</p> <p>The sector has an ageing workforce, which risks tacit skills being lost and raises the importance of career progression and CPD for the existing workforce.</p>	<p>A growing global population and concerns over food security are increasingly important policy issues that place additional socio-economic importance on the sector.</p> <p>The sector will increasingly face both threats and opportunities from climate change.</p> <p>The sector is likely to be more science and technology focused, with the pressures of climate change, food security and demographics as precision agriculture and sustainable intensification are implemented.</p> <p>The sector needs to attract more</p>

		<p>The sector remains dominated by males, who make up more than two-thirds of the workforce (68%). This is considerably higher than the UK average for all sectors.</p>	<p>(young) people into its occupations. To do this, it needs to raise the profile and awareness of jobs at all levels that exist in the sector's industries and of the available career paths.</p>
<p>4. Construction</p>	<p>The sector employs 2.1 million people and contributes £90 billion to the UK economy.</p> <p>High levels of self-employment dominate the sector with small and medium-sized enterprises (SMEs) accounting for 95%.</p> <p>12% of construction takes place off-site.</p> <p>The global construction market is forecast to grow by over 70% by 2025, with positive signs of growth for the industry in the UK.</p> <p>A key challenge for the sector is to maintain its supply of skills, especially during periods of weak demand.</p>	<p>Changes in technology have the possibility of significantly changing the industry. They are primarily digital technology – notably building information modelling (BIM) – and off-site construction processes.</p> <p>Low carbon skills need to be embedded across the sector, the primary driver being the Green Deal but also the opportunity to compete globally.</p> <p>The external image of the industry is important in recruitment, relationships with clients and Government. The current image is poor, due to the lack of technology, poor quality, poor health and safety records and precarious employment terms.</p> <p>Careers information, advice and guidance to those seeking opportunities in the construction sector that include consideration of offsite construction job</p>	<p>Additionally, the construction industry is at epicentre of the growth in population, ageing population and immigration.</p> <p>The UK population in the middle of 2014 was 64.6 million, increasing by 491,000 on the year before.</p> <p>The construction industry is sensitive to the level of economic growth and is vulnerable to a cyclical economy.</p> <p>The issues of climate change and carbon mitigation and adaption are important as source of work and employment. They will affect the legislation imposed on the industry and attitudes within it.</p> <p>Under the Climate Change Act 2008, emissions are targeted to</p>

		roles could help offer clear pathways to higher level occupations as well as promoting offsite to a greater diversity of people, including young people.	fall by 26% by 2020 and by no less than 80% to 2050. The built environment is one of the largest contributors to greenhouse emissions, and therefore the sector has a major role to play in addressing the challenge, through its changing systems and processes and the skills that support them.
5. Information economy	<p>Of the 31 million people working in the UK in 2016, 1.1 million (6%) were working in the digital sector – 1.16 million (61%) within digital businesses and a further 0.65 million (39%) as digital specialists within other parts of the economy.</p> <p>There were 170,000 digital enterprises in the UK in 2015 representing 7% of the entire UK business population.</p> <p>Employment across digital businesses is mainly focussed in IT (74%), with telecoms employing 24% and games 2%.</p> <p>Turnover amongst digital businesses in 2014 was £209 billion, 6% of the UK total.</p> <p>Virtually all-digital enterprises (99.8%) were classed as SMEs and the proportion</p>	<p>The sector is expected to need 1.2 million new workers between 2012 and 2022, to both support growth and replace those leaving the sector.</p> <p>Just under one quarter (23%) of the technology industry workforce were female compared with a figure of 47% for workers as a whole.</p>	<p>The internet, computing and mobile communications have a transformative effect on how all businesses succeed. The impact of digital platforms, products and services will go far beyond the information and communications technology (ICT) sector.</p> <p>New technologies and capabilities can improve productivity and efficiency in existing industries across the UK economy. These areas include:</p> <ul style="list-style-type: none"> - cyber security - data - the internet of things - satellite earth observation - electronics - sensors and photonics

	<p>of large digital employers was half that for UK industry as a whole (0.2% and 0.4% respectively).</p> <p>Almost half of digital and creative sector workers are in London and South East England.</p> <p>The number of workers in the digital industries increased by almost three times the rate recorded for all UK workers over the past five years (2010-2015).</p>		<p>- robotics and autonomous systems</p>
<p>6. International education</p>	<p>Employment in the sector has grown by 34% since 2002 and in 2010 three million people were employed in education across the UK, constituting 11% of total employment. There are some 67,000 education establishments in the UK and they are larger than average workplaces, with two thirds employing at least 10 people.</p> <p>During 2014–15 the UK higher education sector catered to over two million students who hailed from approximately 200 countries and studied over 90 different types of courses, across 1,000+ different detailed subjects. These students attended nearly 800 institutions, which can be categorised into three broad types:</p>	<p>Future skills needs of teachers include the basic skills of literacy and numeracy in order to join the sector workforce; pedagogic skills to deliver learning effectively and certain specific subjects such as STEM. Teachers also need communication and interpersonal skills to respond to a diverse range of learners from different international countries, with high levels of e-Learning and varied personalised demands.</p> <p>The education sector workforce is highly qualified, with 63% holding S/NVQ Level 4 or higher qualifications, compared to 37% across the whole economy.</p>	<p>Two education occupations: maths and science teachers in secondary education and special educational needs teachers in special schools, appear on the Migration Advisory Committee (MAC) list of skill shortage occupations.</p> <p>920,000 teaching and educational professionals are forecasted to be needed over the period 2014-2024 to meet expansion and replacement demand.</p>

	<p>higher education institutions, which are traditionally universities, further education colleges (FECs) and alternative providers (APs).</p> <p>UK expenditure on education in 2015 was 11 per cent of Gross Domestic Product (GDP) (£85 billion).</p> <p>In 2014-15 International students were responsible for £10.8 billion of UK exports earnings.</p> <p>The sector has a high proportion of part-time workers as only 60% of the education workforce work full-time, compared to 73% of the UK workforce.</p> <p>Across the UK, 72% of the education sector workforce are women, compared with an average of 46% in all sectors.</p>	<p>Technological advancements have a direct impact on the requirement for education professionals to have relevant skills to use digital technology effectively, in order to help deliver inspiring learning experiences and engage with learners in the classroom, in employment or at home.</p>	
<p>7. Life Sciences</p>	<p>The UK life sciences industry is high-tech, research-intensive, innovative and highly diverse, spanning biopharmaceuticals, diagnostics, devices and medical technology engineering.</p> <p>482,000 UK jobs were supported by the industry. These comprise of 140,000 direct employees of life sciences firms,</p>	<p>A highly skilled workforce is key to maintaining a world-class science base, so attracting and maintaining talent must remain a priority.</p> <p>The importance of a thriving academic science base to the continued strength and success of the UK life sciences industry cannot be underestimated.</p>	<p>Over the past decade, the global process of drug discovery has shifted, becoming more open and collaborative across both disciplines and sectors.</p> <p>The NHS has to meet the challenge of delivering more healthcare with limited resources.</p>

	<p>196,000 jobs in the supply chain and 146,000 supported through induced effects.</p> <p>5,633 life sciences companies in the UK with a combined annual turnover of £60.7 billion and employment of 222,000:</p> <ul style="list-style-type: none"> - biopharmaceutical core: 664 companies, 62,300 jobs, £28.9 billion turnover - biopharmaceutical services and supply: 1,250 companies, 44,600 jobs, £10.7 billion turnover - medical technology core: 2,683 companies, 89,870 jobs, £17 billion turnover - medical technology services and supply: 1,000 companies, 24,600 jobs, £3.9 billion turnover <p>Pharmaceutical industry spend in 2015 on research and development in the UK was £4.2 billion.</p> <p>There has been an upward growth in life science foreign direct investment capital expenditure in the UK between 2011 and 2015. The compound annual growth rate was approximately 6%.</p>	<p>There are many examples of world leading medical products and technologies that have their origins in UK academic institutions.</p> <p>Ensuring that the technology transfer environment remains fit for purpose is important to ensure UK research can be effectively translated into commercial products in the UK.</p> <p>Skills identified as difficult to recruit included those in complex invivodisease models; translational clinicians and experimental medicine; medicinal chemists; informaticians; data scientists; and DMPK skills.</p>	<p>Robust and enforceable IP rights are a fundamental pillar of the life science community.</p> <p>Collaboration and open innovation are becoming increasingly important in the UK drug discovery ecosystem, which is increasingly moving towards a partnership, with outsourced approach for access to expertise and better integration across sectors. This is demonstrated by the rapid expansion of the contract research organisation (CRO) sector and growing number of cross-sector collaborations in the UK.</p>
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<p>8. Nuclear</p>	<p>Nuclear energy has supplied up to a third of the country's electricity safely and reliably since 1956. The UK industry, with 15 reactors on 9 sites, currently supplies over a fifth of the country's electricity.</p> <p>It currently prevents the release of around 49,000,000 tonnes of carbon dioxide (CO₂) every year from the UK the equivalent of taking 78% of Britain's cars off the road.</p> <p>The civil nuclear industry employs more than 65,000 highly skilled people throughout the UK, (22% of which are women), with a total of over 100,000 jobs directly or indirectly linked with the industry.</p> <p>The government's highest priority in this Parliament is to ensure that the UK has a secure and resilient energy system.</p> <p>The UK's nuclear fleet currently generates 21% of the country's electricity but all of them are due to retire between 2023 and 2035. These stations are being replaced with 18GW of new nuclear capacity planned to come online in the 2020s.</p>	<p>Skills shortages: demand for skilled engineers and technicians outweighs supply.</p> <p>Ageing workforce: new recruits needed every year to meet projected demand.</p> <p>New entrants: limited numbers of young people entering the sector</p> <p>Employers need to collaborate to plan for the future.</p>	<p>The UK government's projection is that 95GW of new generating capacity will be needed and constructed by 2035, which is equivalent to 90% of the grid's current capacity.</p> <p>Decarbonisation - the UK also has an ambitious target to reduce greenhouse gas emissions by 80% from 1990 levels by 2050.</p> <p>The Department has agreed terms on a deal to support construction of Hinkley Point C, a new nuclear power station that could generate around 7% of the UK's electricity.</p> <p>A large amount of the UK's electricity generation plant is set to close over the next two decades. In particular, the Department expects almost all existing nuclear and coal-fired power stations, which together generate almost half of the UK's power, to close by the end of the 2020s.</p> <p>Big opportunities also exist for</p>
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<p>9. Offshore wind</p>	<p>Offshore wind has been increasing its contribution both to fulfilling energy needs and also to employment, and by 2020 could account for 7-12% of UK electricity generation. Onshore wind already provides over 5% of the UK's total electricity generation.</p> <p>The UK has one of the best offshore wind resources in the world. Last year, offshore wind produced over 4% of the UK's power, and with continued support this could more than double by 2020 alone.</p> <p>There were around 18,500 people directly employed in wind, wave and tidal energy industries in 2013 (74% increase since 2010) - a further 70,000 direct and indirect jobs could be created by 2023.</p> <p>The UK's offshore sector continues to grow. In 2014, power from offshore wind increased to 13,280 gigawatt-hours (GWh) - the equivalent to burning</p>	<p>The skillsets required in the wind and marine energy sector are similar to those demanded in other sectors of the economy; however, as a workforce, the sector has proportionally more highly skilled occupations than the UK economy as a whole and therefore faces intense competition for talent.</p> <p>Poor visibility of (and consequently interest in) the sector as a career prospect among young people and potential new entrants from other industries.</p>	<p>Future employment projections show a shift in emphasis away from activities that relate to the early stages of deployment, such as planning and development, and towards more operations and maintenance-oriented functions. This is a feature of the future maturation of the industry and crucially also marks a transition to more permanent jobs, which are sustained by the requirement to supply renewable electricity, rather than jobs that depend on continued construction.</p> <p>Beyond 2020 both onshore and offshore wind, alongside an increasing presence of wave and tidal stream power, are expected to remain important in the UK's efforts to build up new sources of generation as it decarbonises electricity generation while</p>

	5.1 million tonnes of coal, enough to power over 3 million homes.		reducing price volatility and dependence on imported fuel sources.
10. Oil and gas	<p>Across the UK, oil and gas supported around 330,000 jobs in 2016. This represents a 27% reduction from peak employment of around 450,000.</p> <p>In 2015, over 61,000 people travelled offshore for oil and gas exploration and production.</p> <p>Oil and gas provided 70% of the UK's total primary energy consumption in 2015, with oil for transport and gas for heating being dominant uses.</p> <p>Global oil demand grew strongly in 2015 by 1.8 million barrels per day (mb/d). Although demand is expected to continue to rise this year, the rate of growth is expected to slow.</p> <p>Gas demand in the UK rose moderately by 2.2% in 2015 to 72 billion cubic metres (bcm), but is still 30% below the peak in demand in 2004.</p>	<p>Continued growth is driving up demand in an already tight labour market, resulting in ongoing specific labour market issues, including hard-to-fill vacancies and skills shortages alongside rampant wage inflation.</p> <p>33% of businesses in the upstream oil and gas sector have hard-to-fill roles. The areas where businesses have identified these job roles are: design engineers, marine crew, mechanical engineers and CAD designer/draughts people.</p> <p>The key reason cited for hard-to-fill roles is that industry demand for suitably skilled applicants continues to outstrip supply – cited by 76% of businesses with hard-to-fill roles. A lack of applicants with experience in upstream oil and gas was cited by 30% of businesses, while a lack of qualification was also cited at 24%.</p> <p>Skills shortages also exist within the current workforce: 24% of businesses</p>	<p>The industry had grown accustomed to an oil price in excess of \$100 per barrel and the sharp fall to below an average of \$50 per barrel has impacted right across the sector.</p> <p>As a consequence the industry's focus has increasingly turned towards delivering efficiency improvements, building on cost reductions and rationalisation of activity.</p> <p>As an industry we are producing at four times the rate we are discovering new reserves – this is unsustainable. The rate of exploration drilling has to improve and be more successful.</p> <p>In the UK, capital investment is falling rapidly after years of record expenditure that peaked at £14.8 billion in 2014. Last year, around £11.6 billion was invested and this is likely to decline to around</p>

		<p>with engineering and technical staff cited skills shortages as a particular issue.</p> <p>Apprentices are a particularly popular route for larger employers: 29% of businesses with 50 or more employees in the sector have employed an apprentice in the last two years.</p>	<p>£9 billion this year and £7 billion in 2017.</p>
<p>11. Professional and business services</p>	<p>The professional and business services (PBS) sector is the UK's largest economic sector, employing 3.3 million people. With 10% of UK employment it accounts for 9.3% of all UK economic output (£142 billion) and contributes around £16 billion per year to the Exchequer in taxes.</p> <p>It includes legal services, accountancy, consultancy, architectural and engineering services, advertising and marketing, employment services and more.</p> <p>The sector's exports exceeded £50 billion for the first time in 2012-13.</p>	<p>With 600,000 jobs expected to be created in the sector by 2020, widening access to skills is critical.</p> <p>The PBS sector already engages more 'higher level' (post A level) apprentices than any other sector.</p>	<p>Nearly all organisations in the economy need to make use of professional and business services to ensure their smooth and efficient running. These services are of crucial importance for business start-ups.</p> <p>Firms in the PBS sector account for almost a quarter (24.5%) of the 1,000 fastest growing companies, with revenues between £30 million and £1 billion.</p> <p>There will continue to be greater use of data analytics and 'big data' across the sector.</p>
<p>Advanced</p>	<p>Advanced manufacturing is broadly 'manufacturing that is intensive in its use</p>	<p>The sector has a high skilled workforce. Nearly half (44%) hold qualifications at</p>	<p>There are a range of structural and technological developments</p>

<p>Manufacturing</p>	<p>of capital and knowledge and requires a high level of technology utilisation and Research and Development (R&D)'. It can apply to all manufacturing industries, but is most commonly associated with high-tech and medium-high tech industries containing industries such as:</p> <ul style="list-style-type: none"> - automotive - pharmaceuticals - chemicals - electronics and electrical manufacture - manufacture of other transports (aerospace) - scientific research and developments <p>The advanced manufacturing sector comprises of 29,000 enterprises in the UK, which employ approximately 1.3 million people. These enterprises generated over £72 billion of GVA in 2013.</p>	<p>Level 4 or above.</p> <p>Advanced manufacturing employers generated over £72 billion of GVA in 2013.</p> <p>The sector has a predominantly male workforce – only 26% of the workforce are female.</p> <p>Advanced manufacturing employers are also more likely to report hard-to-fill vacancies compared to the economy as a whole (9% versus 5%).</p> <p>The number of high-skilled jobs in the sector is projected to increase, but the growing automation of production processes will likely lead to a reduction in elementary and machine operative roles.</p>	<p>driving advanced manufacturing, which are:</p> <ul style="list-style-type: none"> - translating innovation into growth - increasing investment in R&D - meeting low carbon legislation - maximising export opportunities - transformative enabling technologies <p>Additionally, due to lack of available talent, there is strong competition from the prime contractors, major Tier 1 suppliers and from other industries that require similar skill-sets (eg automotive), further amplifying the problem.</p>
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